The invention relates to abrasive tools and particularly to tools of the power driven abrasive belt class.

In various arts the surface left on metal by an abrasive wheel, cutting tool or the like, is not smooth enough or fine enough for the uses to which it is to be put; and it is desirable to perform a final finishing operation thereon by a very fine grained abrasive cloth or paper.

A large class of such surfaces are cylindrical surfaces, for example the bearings of an engine crank shaft. Such surfaces can be rotated in a machine between centers and in the case of crank shaft bearings are rotated in the machine that grinds them to size; and the invention has particular application to finally finishing rotating cylindrical surfaces; although as will appear hereinafter, it may be applied with advantage to non-rotary surfaces and to various shapes of surfaces.

The actual invention hereof is that set forth in the appended claims.

In general, however, the invention comprises an abrasive belt, supported on pulleys and driven by an electric motor. A long flight of belt is provided between widely spaced pulleys and the said flight while running on the pulleys is the part of the belt that is applied to the work, whereby the yielding of the belt flight makes the contact of the abrasive with the work a yielding contact.

The motor, belt and pulleys are mounted in a portable frame of light weight whereby it may be easily brought to the work and operated manually. Handles are provided for both hands of the operator, and so disposed that the weight of the device is well balanced in his hands, and so that he can apply the belt flight to the work with easily controlled yielding pressure, by a simple rocking movement of the handles.

Improved means is provided to adjust the tension of the said belt flight, and to permit the belt to be readily removed and replaced when worn; or to substitute for it one of different grain.

The objects of the invention are:

To provide generally an improved abrasive tool of the class referred to;

To provide an abrasive tool having the mode of operation and construction features among others set forth above.

The invention is fully disclosed in the following description in connection with the accompanying drawing, in which:

Fig. 1 is a side elevational view of a tool embodying the invention;

Fig. 2 is a top plan view of the embodiment of Fig. 1;

Fig. 3 is a sectional view from the plane 3—3 of Fig. 1 with parts broken away;

Fig. 4 is a sectional view from the plane 4—4 of Fig. 1 with parts broken away;

Fig. 5 is a sectional view from the plane 5—5 of Fig. 1 with parts broken away.

Referring to the drawing, there is shown generally at 1 a frame comprising an elongated base 2, generally horizontal in the illustrated position of use, a vertical leg 3 depending from the rearward end of the base, an inclined leg 4 depending from the forward end; the frame thus being generally of downwardly open U-form, and preferably all in the same plane.

An electric motor 5 is mounted on the frame in the corner where the base 2 and leg 3 meet; and with its shaft at right angles to the plane of the frame; and preferably the leg 3 is made separate from the base 2 and both secured, as by screws 6 to a bracket 7 mounted on the motor by screws 8—8.

The motor 5 drives a crowned belt pulley 10, preferably covered by a sheet metal hood 11 secured to the frame by some of the screws 6.

Elongated parallel handles 12—13 are provided at opposite ends of the motor 5, and spaced therefrom as shown in Fig. 2; and inclined downwardly rearwardly as shown in Fig. 1. The preferred construction is to bend a piece of round rod into U-shape, with parallel legs 14—14 and to weld the closed end 15 of the U to the top of the base 2 as at 16; and to telescope rubber or like grips 17—18 over the legs as shown.

An electric switch 19 is mounted on the handle 12 convenient to the thumb of the operator gripping that handle, and controls the circuit to start and stop the motor 5 represented by the electric cord 20.

As shown in Figs. 1 and 4, the leg 3 has a bracket 21 slideable thereon, secured in a suitably adjusted position longitudinally of the leg by a manually operable set screw 22. A crowned belt pulley 23 is mounted to rotate on the bracket 21, by an axial bolt 24 of a bearing, and the bearing proper may be a ball bearing of well known type within the pulley and not shown.

On the frame end portion 4, a sheet metal bracket 25 is welded and mounts a crowned pulley 26 by an axial bearing bolt 27; and this bearing also is of the well known ball bearing type within the pulley and not shown.

The frame is preferably made from square sec-
tion tubing as shown at 3 and 4 in Figs. 3, 4, and 5. This facilitates connecting the motor to it, and keeps the bracket 21 from rotating on the leg 3 and provides a firm welded joint for the handle at 16, etc., etc.

The three crowned belt pulleys 10, 23, and 25 are all in linear alignment and a closed belt 28 is mounted on them in triangular configuration, and driven by the motor pulley 10, and retained thereon by the crowns of the pulleys in a well-known manner.

The pulleys 23 and 25 are disposed so that the belt flight 29 between them is at a slight upward forward inclination with respect to the base 2.

The belt 28 is a commercial abrasive belt having abrasive on its outer face as indicated at 30, Fig. 5.

The tension of the belt may be adjusted by adjusting the position of the bracket 21 along the leg 3 as will be understood.

From the above description, it will be seen that an operator may grip the two handles 12—13 in his two hands at points thereon at which the weight of the motor 5 and of the frame will be supported by his hands and in a substantially balanced condition; that is, the forward portion of the frame including the base 2 and the depending portion 6 will have a tendency to rock downwardly, by gravity, but will be easily counteracted by the operator. He can thus easily support the tool with the working belt flight 29 in a generally horizontal or upwardly inclined position, projecting forwardly from him.

To finish a surface, as referred to, the operator starts the motor 5 and manipulates the handles to lay the moving belt flight 29 on top of the surface, preferably at the intermediate part of the belt flight 29 whereby the belt flight will yield or exert a cushioned pressure on the work surface. The operator may adjust this pressure from barely a feather contact pressure to a maximum pressure by simply rocking the handles, with wrist motion as will be understood, to raise or lower the pulley 26 and the belt flight 29 at its intermediate working portion.

The arrangement of the handles and the balance of the weight as described makes the adjustment of the pressure on the work by the operator extremely sensitive.

Besides raising and lowering the belt flight as referred to, the operator can obviously swing the belt from side to side by the handles to work a surface of considerable transverse extent without changing the position of his body.

By having the handles 12—13 far apart as shown, the operator can raise one or lower the other to thereby keep the belt flight 29 in flat contact with the work.

The whole tool may be picked up or laid down conveniently as a completely self-contained tool.

The belt can be removed at any time to renew it or replace it with a fresh one or one of different grain, by loosening the adjusting screws 22 and sliding the pulley 26 up along the leg 3; and after placing on a new belt it may be tensioned as desired by the reverse of this operation. The belt is readily removable endwise from the pulleys, the described support for them making this possible.

The hood 11 over the pulley 10 provides protection to the operator from flying particles, and its use is optional, but when utilized may be removed before removing the belt.

At 31, Figs. 1 and 2, is indicated a work piece of the kind having a cylindrical surface 32 to be finished by the tool, and it is assumed that it is rotatably supported and rotatably driven by means not shown.

The cushioned yielding of the belt flight 29 by pressure applied by the operator is indicated by the broken line position of the belt flight at 29A.

Changes and modifications may be made in the above described structure such as will occur to those skilled in the art and the invention is comprehensive of all such modifications and changes that come within the scope of the appended claims.

1. In a manually portable and operable surface finishing tool, a frame comprising an elongated base member and a leg generally upright in the position of use, depending from one end portion of the base member, and the base member having a depending base portion spaced from the leg; a motor on the frame at the top of the leg; a first belt pulley driven by the motor; a second belt pulley on a lower portion of the depending leg; and a third belt pulley on the depending base portion; an arm means for engaging the belt flight to change the position on the leg to tension the belt; a pair of elongated substantially parallel side by side handles mounted on the frame, spaced transversely with respect to the longitudinal direction of the working belt flight and at opposite sides of the motor, on which the working belt flight is rotatably supported and substantially balanced when gripped in the hands of an operator; and the handles disposed so that the working belt flight extends longitudinally away from both handles, and so that when the handles are both rocked in unison around a common handle axis transversely of the longitudinal direction of the working belt flight, the belt flight will rock bodily around the axis toward and from the work surface.

2. In a manually portable and operable surface finishing tool, a frame comprising an elongated base member extending forwardly and rearwardly in the position of use; and a leg depending from a rearward portion thereof; a first and a second belt pulley mounted on a lower portion of the leg and on a forward portion of the forwardly and rearwardly extending base portion respectively; a motor mounted on a rearward portion of the base portion, above the first pulley and driving a third belt pulley; an abrasive belt of triangular configuration running on the three pulleys and having a working belt flight extending longitudinally forwardly and rearwardly between the first and second pulleys for finishing a work surface thereof; a pair of spaced apart handles secured to a rearward part of the frame and both above the corresponding rearward end of the working belt flight for manually supporting the frame, motor and belt, and the working belt flight extending forwardly longitudinally away from both handles; the parts arranged so that the handles may be manually rocked in unison about a common handle axis transverse to the rearward end of the working belt flight and when so rocked the working belt flight will rock bodily about said handle axis toward and from the work surface.

3. A manually portable and operable surface finishing tool comprising: a frame rotatably supporting spaced pulleys; an abrasive belt on the pulleys comprising a working belt flight extend-
along longitudinally between the pulleys; a belt driving motor on the frame; a pair of side-by-side spaced handles on the frame for manually supporting the frame, motor and belt; the handles disposed so that when the belt flight is in a position of use to work a surface thereunder, the handles are above one end portion of the belt flight and the belt flight extends longitudinally away from the handles, and so that when both handles are manually rocked in unison in the same direction about an axis transverse to the belt flight, the belt flight is rocked bodily about said axis toward and from the surface to be worked.

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